

(12) UK Patent Application (19) GB (11) 2 124 472 A

(21) Application No 8315383  
(22) Date of filing 3 Jun 1983  
(30) Priority data  
(31) 385151  
(32) 4 Jun 1982  
(33) United States of America  
(US)

(43) Application published  
22 Feb 1984

(51) INT CL<sup>3</sup>  
A43B 3/20 17/00

(52) Domestic classification  
A3B 3C 8F2

(56) Documents cited  
US 3798503  
US 3648109

(58) Field of search  
A3B

(71) Applicant  
Kimberly-Clark  
Corporation  
(USA—Delaware),  
North Lake Street,  
Neenah, Wisconsin  
54956, United States of  
America

(72) Inventors  
Thomas L. Hellman,  
J. Michael Conner

(74) Agent and/or Address for  
Service  
Frank B. Dehn and Co.,  
Imperial House, 15—19  
Kingsway, London  
WC2B 6UZ

(54) Foot or shoe cover

(57) A seamless sole foot or shoe cover made from a web of material folded and joined together by bonding or adhesive, has an ankle opening,

opposite sides of which are provided with adhesive strips (18 and 22), and an elastic strip (20) provided along the centre of the sole portion. Anti-skid material (30) may optionally be provided on the outside of the cover.

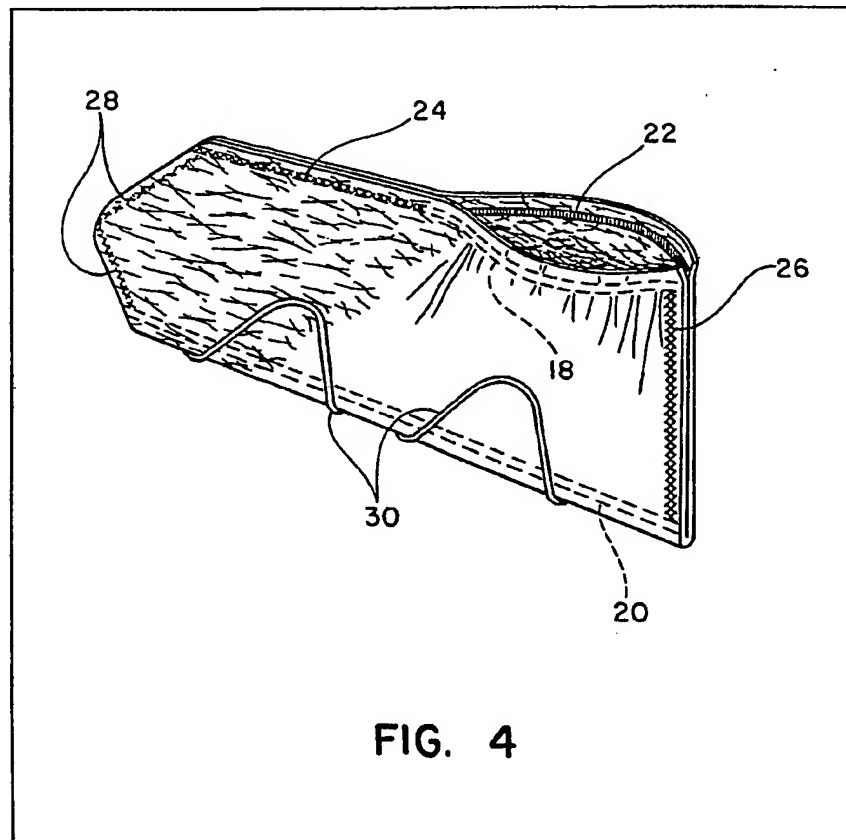
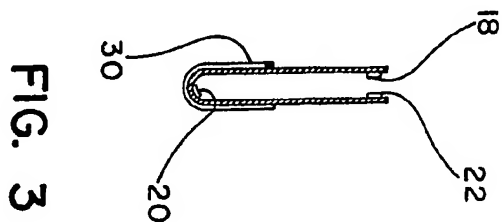
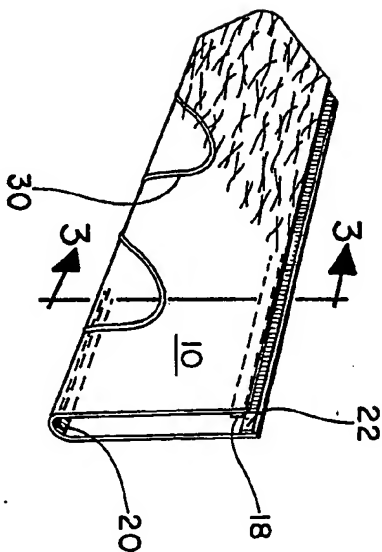
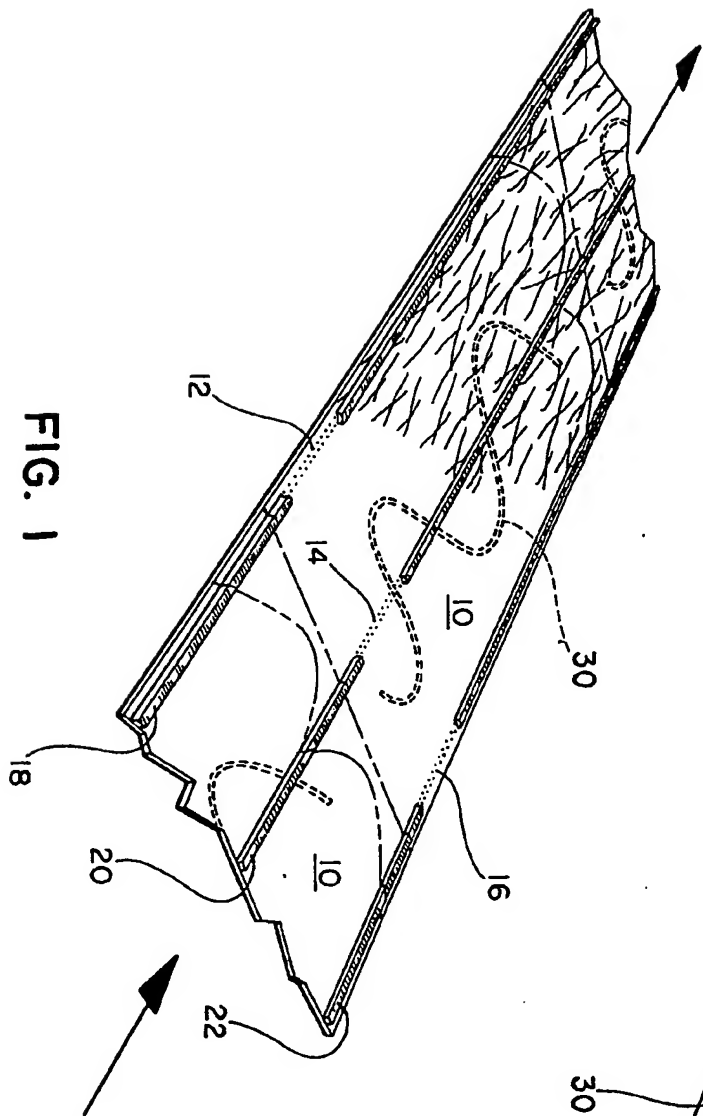


FIG. 4

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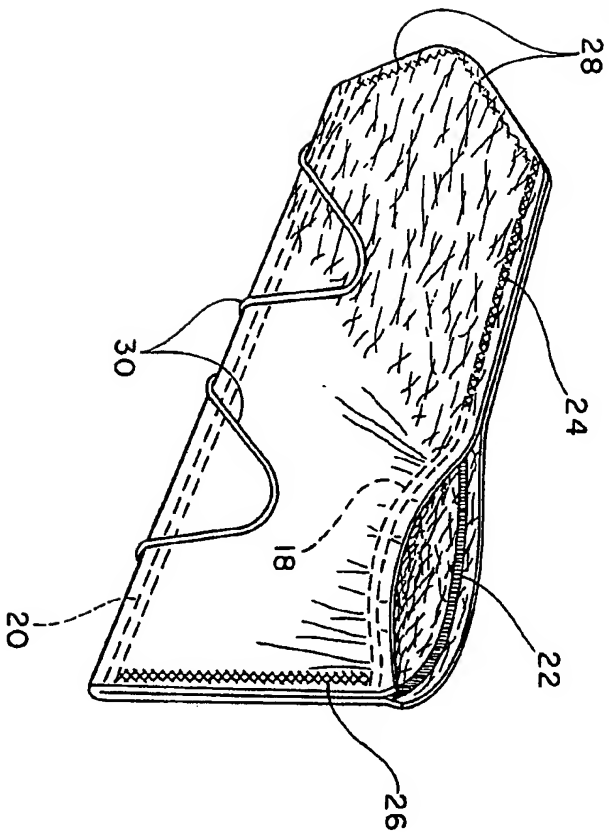


FIG. 4

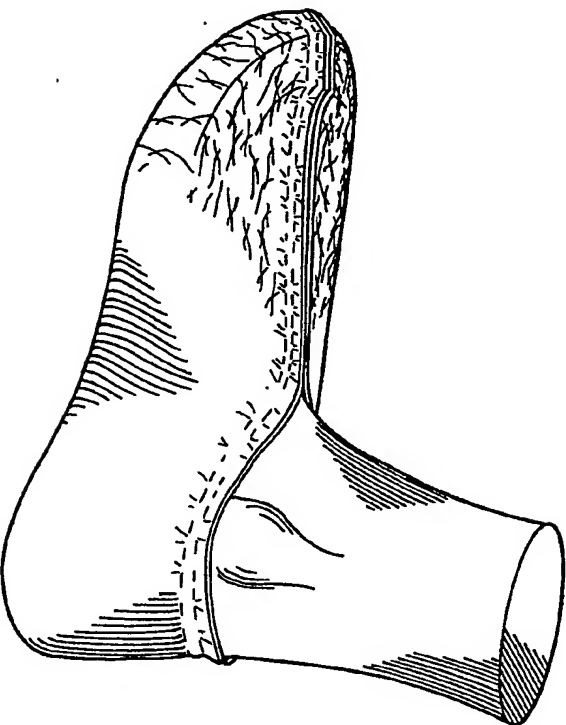


FIG. 5

# SPECIFICATION Foot or shoe cover

The present invention relates to foot or shoe covers and particularly to protective foot or shoe covers and their manufacture. Such covers made from paper, nonwoven materials, and the like have been available for years. However, the disposable nature has required that they be manufactured rapidly and that the design permit a minimum of processing steps. This, in turn, has resulted in available covers that are inconvenient to don or difficult to keep in place during wear. For particularly demanding applications, the necessity for stitching in many cases has reduced the barrier properties of the garment. Since it is the purpose of the garment to act as a barrier either to e.g. prohibit soiling of the wearer's shoes and the like or to prevent contamination from the wearer to the environment, the need exists to provide a cover that is inexpensive and yet satisfies to a high degree these requirements.

Elasticized shoe covers have been described in numerous patents. For example, U.S. Patent 3,798,503 describes a shoe cover having elastic about the ankle and toe portion. U.S. Patent 3,648,109 describes a shoe cover having elastic along a bottom seam and around the ankle opening. The described cover also includes a grounding strip. Various other configurations of covers are also known, such as U.S. Patents 3,422,550, 3,824,714, 3,898,750, 4,019,265 (which also includes elasticized toe and heel portions) and 3,399,329. Other attempts to improve conformability have included the use of heat shrink materials as described in U.S. Patents 3,694,939 and 3,634,954. However, all of these embodiments suffer from one or more of the described deficiencies of difficulty in donning, maintaining in place, or reduced barrier properties. Accordingly, a need exists for an improved cover having a higher degree of these benefits.

Viewed from one aspect the present invention provides a seamless sole foot or shoe cover having a generally rectangular configuration with an ankle opening and an extended toe portion, and including elastic means for conforming the cover to a wearer, wherein an elastic strip is adhesively bonded to the central portion of the sole and elastic strips are adhesively bonded to the opposing sides of the ankle opening.

Viewed from another aspect the present invention provides a method of manufacturing seamless sole foot or shoe covers comprising the steps of providing a continuous base web having side edges and a central portion, adhesively attaching stretched elastic strips to one surface of said base web adjacent each side edge and the central portion, folding said base web upon itself, and bonding said folded base web at spaced locations along the length thereof to define separate covers.

At least in preferred embodiments the shoe or foot cover and method of making the same avoid the need for a seam along the sole portion and yet

provide for both that portion and the ankle portion to be elasticized to improve conformability and wear retention. These benefits are obtained in preferred embodiments by starting with an inexpensive web of paper or nonwoven material or the like, applying parallel elastic strips adhesively centrally in the sole defining portion and at the edges in the ankle defining portions. The web is then folded upon itself, adhesively attached forming the heel and toe portions, and the shoe cover separated. If desired, the covers may be perforated and maintained in a convenient roll form providing for separation prior to use. Also, if desired, an anti-skid material may be applied to the sole portion to improve slip resistance.

Base web materials useful in embodiments of the present invention include a wide variety of paper and nonwoven fabrics. For example, paper webs include scrim reinforced material available under the trademark KAYCEL as well as tissue laminates with reinforcing fibers as described, for example, in U.S. Patent 3,958,055 and nonwoven fabrics include spunbonded webs of polyolefins and the like available under the trademark EVOLUTION and laminates of such materials. Preferred among these are nonwoven fabrics such as laminates of spunbonded and meltblown webs as described in U.S. Patent 4,041,203 which provide durability and improved functionality and appearance.

The elastic material may also be selected from a wide variety of alternatives. Examples include natural and synthetic rubber compounds such as are conventionally used in disposable garments like disposable diapers. Furthermore, elastic adhesive materials such as that available from B.F. Goodrich Company under the trademark TUFTANE may also be employed.

The selection of a particular adhesive will depend upon the chosen base web and elastic as would be apparent to those skilled in this art. For high speed, continuous operation, it is preferred that an adhesive be selected that is capable of quick set such as are available, for example, from National Starch and Chemical Company under designation 34-2847 and from Findley Adhesives, Inc. under designation 995-336.

When an anti-skid material is applied, it is preferably selected from compositions providing slip resistance and sufficiently durable and compatible with the base web. When a conductive strip is utilized, it may be selected from any of a number of materials used for such purposes, including those described in U.S. Patent 4,019,265.

An embodiment of the invention will now be described by way of example and with reference to the accompanying drawings, in which:—

Figure 1 illustrates a blank web for making a cover in accordance with the invention, having applied thereto strips of adhesive, elastic portions and the optional anti-skid material;

Figure 2 illustrates the web material folded upon itself;

Figure 3 is a cross section of Figure 2 taken

along lines 3—3;

Figure 4 illustrates a complete cover showing the adhesive bond; and

Figure 5 illustrates the cover in use.

5 Turning to Figure 1, there is shown a web for making a shoe or foot cover in a high speed, continuous process of manufacture. Thus, a base web 10 of, for example, spunbonded nonwoven material such as EVOLUTION (trademark) fabric available from Kimberly-Clark Corporation, has applied thereto three continuous adhesive lines 12, 14, and 16. These adhesive lines will normally be of the same composition, but may be of differing compositions if desired. While the adhesive is active, elastic strips 18, 20 and 22 are applied and adhered and maintained in a stretched condition. The elastic strips 18 and 22 are preferably applied intermittently so as to extend along the ankle opening regions only. As shown in Figures 2 and 3, web 10 is then folded upon itself and adhered in the nonelasticized edge portions 24 (Figure 4). The heel and toe portions 26, 28 are then bonded, preferably by means of heat and pressure or by means of ultrasonics in the case where a thermoplastic base web is employed, as shown in Figure 4. A complete foot or shoe cover is thus formed and may be separated or maintained in roll form and separated just prior to use. As shown in Figure 5, the cover is very conformable and presents an elasticized, yet seamless sole portion.

In the preferred embodiment, anti-skid material 30 is applied to the sole portion of the web as indicated in Figure 1. Such material may be applied by any of a variety of coating, printing or other such means known to those skilled in the art. As will be apparent, only a minor, for example, 6 to 10% of the sole surface need contain such anti-skid material for effective results.

40 The shape of the cover may vary, but, the generally rectangular configuration as shown in Figure 4 having a rounded toe end portion is preferred for ease of manufacture and reduced waste of material. As shown, the cover can be manufactured automatically and continuously and yet provides a very effective and convenient product.

Thus, in the preferred embodiment there is provided a foot or shoe cover useful for hospitals, laboratories, clean rooms, and other applications where it is desired to temporarily protect the wearer's footwear from the environment. The protective garment construction provides improved protection due to its seamless sole construction and improved conformability due to elastic placement. Increased economy of manufacture is also obtained since the protective garment is capable of high speed, automatic manufacture. The garment comprises a generally rectangular configuration having one of the short dimensions outwardly rounded to accommodate

the wearer's toes. Parallel elastic strips are placed adhesively along the sole and both sides of the ankle portion which cooperate to provide improved conformability and retain the cover garment in position during wear. In the preferred embodiment an application of nonskid material is made to the outer sole portion to improve resistance to slip. Furthermore, if desired, a conductive strip may be applied to provide earthing especially for hospital operating room use. The protective garment is formed from a continuous web rapidly and with a minimum of waste material.

## 75 CLAIMS

1. A seamless sole foot or shoe cover having a generally rectangular configuration with an ankle opening and an extended toe portion, and including elastic means for conforming the cover to a wearer, wherein an elastic strip is adhesively bonded to the central portion of the sole and elastic strips are adhesively bonded to the opposing sides of the ankle opening.

2. A cover as claimed in claim 1 further containing anti-skid material on the sole surface.

3. A cover as claimed in claim 1 or 2 made substantially of nonwoven fabric.

4. A cover as claimed in claim 3 made substantially of spunbonded polypropylene and bonded by heat and pressure.

5. A cover as claimed in claim 3 made substantially of spunbonded polypropylene and bonded by sonic energy.

6. A cover as claimed in claim 1 or 2 made substantially of paper-based material.

7. A method of manufacturing seamless sole foot or shoe covers comprising the steps of providing a continuous base web having side edges and a central portion, adhesively attaching stretched elastic strips to one surface of said base web adjacent each side edge and the central portion, folding said base web upon itself, and bonding said folded base web at spaced locations along the length thereof to define separate covers.

8. A method as claimed in claim 7 wherein the elastic applied adjacent said side edges is applied intermittently so as to extend only along regions defining ankle openings.

9. A method as claimed in claim 7 or 8 including the additional step of applying a nonskid material to the outer surface of said base web.

10. A method as claimed in claim 7, 8 or 9 including the step of cutting said bonded base web so as to form a rounded toe end portion.

11. A foot or shoe cover substantially as hereinbefore described with reference to the accompanying drawings.

12. A method of manufacturing a foot or shoe cover, substantially as hereinbefore described with reference to the accompanying drawings.